



# **Commission on Teacher Credentialing**

## **Mathematics Instructional Certificate and Mathematics Instructional Leadership Specialist Credential Program Standards**

*Adopted by the Commission, September 2010*

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## **Preconditions**

### **Mathematics Instructional Certificate Programs and Mathematics Instructional Leadership Specialist Credential Programs**

#### **Mathematics Instructional Certificate (MIC) Program**

1. A program sponsor that operates a program for the Mathematics Instructional Certificate (MIC) shall determine, prior to admission to the credential program, that each candidate possesses a valid California teaching credential requiring a bachelor's degree and a professional preparation program, including student teaching or a clear, full-time designated subjects teaching credential, provided that the holder also possesses a bachelor's degree and has met the basic skills requirement, or its equivalent. The prerequisite credential must include an authorization to teach English learners.
2. A Commission-approved program shall determine prior to recommending a candidate for the MIC, that the candidate has three years of teaching experience.
3. Prior to admission, the program sponsor shall verify the candidate's level of mathematics content expertise. Full admission to the K through Pre-Algebra or the K through Algebra I program is contingent on candidate mastery of the relevant mathematics standards as determined by the program (See elaboration of the required mathematics content knowledge below.)

#### **Mathematics Instructional Leadership (MIL) Specialist Credential Program**

1. A Commission-approved program shall determine prior to recommending a candidate for the MIL Specialist credential that the candidate has completed a MIC program.

### **Elaboration of Mathematics Subject Matter Requirements**

The curriculum of the program addresses the Subject Matter Requirements and standards of program quality as set forth in this document. The following is the mathematics background the candidate is expected to know prior to admission to the MIC program.

#### **Subject Matter Domain 1: Algebra**

Candidates demonstrate an understanding of the foundations of the algebra contained in the *Mathematics Content Standards for California Public Schools (1997)* as outlined in the *Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (2005)*. To ensure a clear understanding of the conceptual underpinnings of algebra in elementary and middle school settings, candidates are skilled at symbolic reasoning and use algebraic skills and concepts to model a variety of problem-solving situations.

## 1.1 Algebraic Structures

- Apply basic properties of real and complex numbers in constructing mathematical arguments (e.g., if  $a < b$  and  $c < 0$ , then  $ac > bc$ )
- Know that the rational numbers and real numbers can be ordered, but that any polynomial equation with real coefficients can be solved in the complex field
- Know why graphs of linear inequalities are half planes and be able apply this fact (e.g., linear programming)

(Mathematics Content Standards for California Public Schools, Grade 6, Number Sense: 1.0, 2.0; Grade 7, Algebra and Functions: 1.0; Algebra I: 1.0, 3.0-7.0, 9.0-15.0, 24.0, 25.0; Geometry: 1.0, 17.0; Algebra II: 1.0-8.0, 11.0, 24.0, 25.0; Trigonometry: 17.0—Students are familiar with complex numbers. They can represent a complex number in polar form, 19.0)

## 1.2 Polynomial Equations and Inequalities

- Prove and use the Quadratic Formula for real and complex quadratic polynomials
- Understand and use the proofs of the following:
  - The Division Algorithm
  - The Factor Theorem
  - The Conjugate Roots Theorem for polynomial equations with real coefficients
- Analyze and solve polynomial equations with real coefficients using the Fundamental Theorem of Algebra

(Mathematics Content Standards for California Public Schools, Grade 7, Algebra and Functions: 2.0-4.0; Algebra I: 1.0, 2.0, 4.0-10.0, 12.0-15.0, 17.0-23.0; Algebra II: 2.0-11.0, 16.0, 17.0)

## 1.3 Functions

- Analyze and derive general properties of functions (i.e., domain and range, one-to-one, onto, inverses, composition, and differences between relations and functions)
- Analyze properties of polynomial, rational, radical, and absolute value functions in a variety of ways (e.g., graphing, solving problems)

(Mathematics Content Standards for California Public Schools, Grade 6, Algebra and Functions: 1.0; Grade 7, Number Sense: 1.0, 2.0; Algebra and Functions: 3.0; Algebra I: 3.0-6.0, 10.0, 13.0, 15.0-18.0, 21.0-23.0; Algebra II: 1.0-4.0, 6.0-17.0, 24.0, 25.0; Trigonometry: 2.0, 19.0)

## Subject Matter Domain 2: Geometry

Candidates demonstrate an understanding of the foundations of the geometry contained in the *Mathematics Content Standards for California Public Schools (1997)* as outlined in the *Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (2005)*. To ensure a clear understanding of the conceptual underpinnings of geometry in elementary and middle school settings, candidates understand, apply, and prove theorems relating to a variety of topics in two- and three-dimensional geometry.

## 2.1 Parallelism

- Know the Parallel Postulate and its implications, and justify its equivalents (e.g., the Alternate Interior Angle Theorem, the angle sum of every triangle is 180 degrees)

(Mathematics Content Standards for California Public Schools, Algebra I: 8.0, 24.0; Geometry: 1.0-3.0, 7.0, 13.0)

## **2.2 Plane Euclidean Geometry**

- a. Prove simple theorems and solve problems involving similarity and congruence (e.g., base angles of isosceles triangles are congruent)
- b. Understand, apply, and justify properties of triangles (e.g., the Exterior Angle Theorem, concurrence theorems, trigonometric ratios, Triangle Inequality, the Pythagorean Theorem and its converse)
- c. Understand, apply, and justify properties of polygons and circles (e.g., derive the area formulas for regular polygons and circles from the area of a triangle)
- d. Justify and perform the classical constructions (e.g., angle bisector, perpendicular bisector)
- e. Use techniques in coordinate geometry to prove geometric theorems (e.g., distance formula, midpoint formula)

(Mathematics Content Standards for California Public Schools, Grade 6, Algebra and Functions: 2.0, 3.0; Measurement and Geometry: 2.0; Grade 7, Measurement and Geometry: 1.0-3.0; Algebra I: 8.0, 24.0; Geometry: 1.0-6.0, 8.0-16.0, 18.0-21.0; Algebra II: 16.0, 17.0; Trigonometry: 12.0, 13.0—Students know the law of sines and the law of cosines 19.0; Mathematical Analysis: 5.0)

## **2.3 Three-Dimensional Geometry**

- a. Demonstrate an understanding of parallelism and perpendicularity of lines and planes in three dimensions
- b. Understand, apply, and justify properties of three-dimensional objects (e.g., derive the volume and surface area formulas for prisms, pyramids, cylinders)

(Mathematics Content Standards for California Public Schools, Grade 6, Measurement and Geometry: 1.0; Grade 7, Measurement and Geometry: 2.0; Algebra I: 24.0; Geometry: 2.0, 3.0, 12.0, 17.0; Mathematical Analysis: 5.0)

## **Subject Matter Domain 3: Number Theory**

Candidates demonstrate an understanding of the number theory and a command of the number sense contained in the *Mathematics Content Standards for California Public Schools (1997)* as outlined in the *Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (2005)*. To ensure a clear understanding of the conceptual underpinnings of number theory in elementary and middle school settings, candidates prove and use properties of natural numbers. They formulate conjectures about the natural numbers using inductive reasoning, and verify conjectures with proofs.

## **3.1 Natural Numbers**

- a. Use basic properties of natural numbers (e.g., properties of divisibility)
- b. Use the Principle of Mathematical Induction to prove results in number theory (e.g., the sum of any two odd integers is even)

- c. Apply the Fundamental Theorem of Arithmetic (e.g., find the greatest common factor and the least common multiple, show that every fraction is equivalent to a unique fraction where the numerator and denominator are relatively prime, prove that the square root of any number, not a perfect square number, is irrational)

(Mathematics Content Standards for California Public Schools, Grade 6, Number Sense: 2.0; Grade 7, Number Sense: 1.0; Algebra I: 1.0, 2.0, 12.0, 24.0, 25.0; Geometry: 1.0; Algebra II: 21.0, 23.0, 25.0; Mathematical Analysis: 3.0)

#### **Subject Matter Domain 4: Probability and Statistics**

Candidates demonstrate an understanding of the statistics and probability distributions for advanced placement statistics contained in the *Mathematics Content Standards for California Public Schools (1997)* as outlined in the *Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (2005)*. To ensure a clear understanding of the conceptual underpinnings of probability and statistics in elementary and middle school settings, candidates solve problems and make inferences using statistics and probability distributions.

##### **4.1 Probability**

- a. Understand and apply basic principles of permutations and combinations
- b. Illustrate finite probability using a variety of examples and models (e.g., the fundamental counting principles)
- c. Use and explain the concept of conditional probability

(Mathematics Content Standards for California Public Schools, Grade 6, Statistics, Data Analysis, and Probability: 3.0; Algebra II: 18.0-20.0; Probability and Statistics: 1.0-4.0)

##### **4.2 Statistics**

- a. Compute and interpret the mean, median, and mode of discrete distributions
- b. Compute and interpret the range of both discrete and continuous distributions
- c. Select and evaluate sampling methods appropriate to a task (e.g., random, systematic, cluster, convenience sampling) and display the results

(Mathematics Content Standards for California Public Schools, Grade 6, Statistics, Data Analysis, and Probability: 1.0, 2.0; Grade 7, Statistics, Data Analysis, and Probability: 1.0; Probability and Statistics: 5.0-7.0)

## Common Standards

### Standard 1: Educational Leadership

The *institution* and education *unit* create and articulate a research-based vision for educator preparation that is responsive to California's adopted standards and curriculum frameworks. The vision provides direction for *programs*, *courses*, teaching, *candidate performance* and experiences, *scholarship*, *service*, collaboration, and *unit* accountability. The *faculty*, *instructional personnel*, and relevant *stakeholders* are actively involved in the organization, coordination, and *governance* of all professional preparation *programs*. *Unit leadership* has the *authority* and *institutional support* needed to create effective strategies to achieve the needs of all *programs* and represents the interests of each *program* within the *institution*. The education *unit* implements and monitors a credential recommendation process that ensures that *candidates* recommended for a credential have met all requirements.

### Standard 2: Unit and Program Assessment and Evaluation

The education *unit* implements an *assessment and evaluation system* for ongoing *program* and *unit evaluation* and improvement. The system collects, analyzes, and utilizes data on candidate and *program completer* performance and *unit* operations. *Assessment* in all *programs* includes ongoing and comprehensive data collection related to *candidate* qualifications, proficiencies, and *competence*, as well as *program* effectiveness, and is used for improvement purposes.

### Standard 3: Resources

The *institution* provides the *unit* with the necessary budget, *qualified personnel*, adequate facilities and other *resources* to prepare *candidates* effectively to meet the state-adopted standards for educator preparation. Sufficient *resources* are consistently allocated for effective operation of each credential or *certificate* program for coordination, admission, advisement, curriculum and *professional development*, instruction, *field-based supervision and/or clinical experiences*, and *assessment* management. Sufficient *information resources* and related personnel are available to meet *program* and *candidate* needs. A process that is inclusive of all *programs* is in place to determine resource needs.

### Standard 4: Faculty and Instructional Personnel

*Qualified persons* are employed and assigned to teach all *courses*, to provide *professional development*, and to *supervise field-based and/or clinical experiences* in each credential and *certificate program*. *Instructional personnel* and *faculty* have current knowledge in the content they teach, understand the context of public schooling, and model best professional practices in teaching and learning, *scholarship*, and *service*. They are reflective of a diverse society and knowledgeable about diverse abilities, cultural, language, ethnic and gender diversity. They have a thorough grasp of the academic standards, frameworks, and accountability systems that drive the curriculum of public schools. They collaborate regularly and systematically with colleagues in *P-12* settings/college/university *units* and members of the broader, professional community to improve teaching, candidate learning, and educator preparation. The *institution* provides *support* for *faculty* development. The *unit* regularly *evaluates* the performance of *course instructors* and *field supervisors*, *recognizes* excellence, and retains only those who are consistently effective.

### **Standard 5: Admission**

In each professional preparation program, applicants are admitted on the basis of well-defined *admission criteria* and procedures, including all Commission-adopted requirements. *Multiple measures* are used in an *admission* process that encourages and *supports* applicants from diverse populations. The *unit* determines that admitted candidates have appropriate pre-professional experiences and personal characteristics, including sensitivity to California's diverse population, effective communication skills, basic academic skills, and prior experiences that suggest a strong potential for professional effectiveness.

### **Standard 6: Advice and Assistance**

Qualified members of the unit are assigned and available to advise applicants and candidates about their academic, professional and personal development, and to assist each *candidate's professional placement*. Appropriate information is accessible to guide each candidate's attainment of all program requirements. The *institution* and/or *unit* provide *support* and assistance to candidates and only retains *candidates* who are suited for entry or advancement in the education profession. Evidence regarding candidate progress and performance is consistently utilized to guide advisement and assistance efforts.

### **Standard 7: Field Experience and Clinical Practice**

The *unit* and its *partners* design, implement, and regularly *evaluate* a planned sequence of *field-based* and *clinical experiences* in order for *candidates* to develop and demonstrate the knowledge and skills necessary to educate and *support* all *students* effectively so that *P-12 students* meet state-adopted academic standards. For each credential and *certificate program*, the *unit* collaborates with its *partners* regarding the criteria for selection of school sites, effective *clinical personnel*, and site-based *supervising personnel*. *Field-based work and/or clinical experiences* provide *candidates* opportunities to understand and address issues of diversity that affect school climate, teaching, and learning, and to help *candidates* develop research-based strategies for improving student learning.

### **Standard 8: District-Employed Supervisors**

*District-employed supervisors* are *certified* and experienced in either teaching the specified content or performing the services authorized by the credential. A process for selecting *supervisors* who are knowledgeable and supportive of the academic content standards for students is based on identified criteria. *Supervisors* are trained in *supervision*, oriented to the *supervisory* role, *evaluated* and *recognized* in a systematic manner.

### **Standard 9: Assessment of Candidate Competence**

*Candidates* preparing to serve as professional school personnel know and demonstrate the professional knowledge and skills necessary to educate and *support* effectively all *students* in meeting the state-adopted academic standards. *Assessments* indicate that *candidates* meet the Commission-adopted *competency requirements*, as specified in the program standards.

Words in *italics* are defined in the Common Standards Glossary available at <http://www.ctc.ca.gov/educator-prep/standards/CommonStandardsTeacherPrep.pdf>

## Common Standards Addendum

If an institution's full response to the Common Standards (2008) has been submitted, reviewed and approved, then the institution need only submit an addendum providing information that is specific to the proposed educator preparation program relative to the institution's recently submitted Common Standards.

Standard 1	Who in the Unit will have <i>leadership</i> responsibilities for this program?
Standard 2	How will evaluation of this program fit into the Unit <i>Assessment System</i> ?
Standard 3	How will this program be supported with <i>resources</i> ?
Standard 4	What will be the criteria for selection of <i>faculty and instructional personnel for this program</i> ?
Standard 5	Are there particular <i>admission criteria</i> for the proposed program?
Standard 6	How will candidates be provided with timely and accurate information about the program? How will candidates requiring additional assistance be <i>guided and supported</i> ?
Standard 7	What will the <i>field experiences and clinical practice</i> include? How will sites be selected and evaluated?
Standard 8	What will be the criteria for selection of <i>district-employed supervisors</i> ?
Standard 9	What will be the program <i>assessments used to determine candidate competence</i> as they move through the program?

## **Mathematics Instructional Certificate (MIC) Program Standards**

### **Category A: Program Design**

#### **Standard 1: Program Design**

The preparation program and any prerequisites include a purposeful, interrelated, and developmentally-designed sequence of coursework and field experiences. The design of the program follows an explicit statement of program philosophy and purpose based on a sound rationale informed by theory, research, and practice. It effectively coordinates and articulates expertise in integrating and applying K-Pre-Algebra and/or K-Algebra I content knowledge, specialized mathematical knowledge for teaching and thinking, and pedagogical knowledge and practices for teaching mathematics.

The sponsoring institution demonstrates a commitment to candidate preparation by providing appropriate support for the program. The program has a qualified leadership team with expertise in mathematics content, mathematics education, teacher education, and teacher leadership.

The program provides extensive opportunities for candidates to demonstrate mathematical and pedagogical content knowledge and skills to support effective mathematics instruction and student learning. Coursework and fieldwork address the complex interplay of math content and pedagogy in effective teaching. Candidates are prepared to enhance mathematical development for all students<sup>1</sup> including English learners, students with disabilities, students who are gifted and talented, and students at risk. Candidates are prepared to collaborate and co-teach with other math teachers as well as teachers of other subject matter disciplines. The program includes a planned process of comprehensive assessments ensuring that candidates are prepared to teach K through Pre-Algebra or K through Algebra I. In addition, its design ensures that candidates are equipped to understand the challenges of developing mathematics literacy among California's diverse student and teaching population.

### **Category B: Curriculum and Fieldwork**

These three mutually supportive domains are defined by the following seven elements and organized into two standards, which provide structure for the program design:

<b>Mathematical Content Knowledge</b>	<b>Specialized Mathematical Knowledge for Teaching and Thinking</b>	<b>Pedagogical Knowledge and Practices for Teaching Mathematics</b>
Admission to the program is contingent on candidate mastery of mathematics as determined by the program based on the math content outlined in the preconditions.	1. Students' mathematical thinking 2. Mathematical representation 3. Mathematical language	4. Mathematics curriculum 5. Instructional planning 6. Classroom discourse 7. Assessment

<sup>1</sup> All "students" refers to, but is not limited to, struggling students, English learners, gifted and talented students, and students with special needs. Program Sponsors will need to address all levels whenever the word "students" is used in this document.

## **Standard 2: Specialized Mathematics Knowledge for Teaching and Thinking**

The program provides opportunities for candidates to develop Mathematical Knowledge for Teaching and understand mathematics content, consistent with the candidate's level of certification. The program provides opportunities for candidates to develop advanced competency to:

1. Plan and implement instruction that includes differentiation, accommodations, and interventions and is based on students' mathematical thinking by:
  - a. Using error analysis processes to review and understand students' misconceptions and to distinguish whether a specific error reflects a misunderstanding of the mathematical process or a need for language development in the area of mathematical concepts
  - b. Understanding the order of presentation of mathematical concepts that lead to student proficiency in mathematics
  - c. Analyzing the learning trajectories of individual students
  - d. Explaining standard and alternative algorithms and solution strategies
2. Use a variety of appropriate methods of mathematical representation, including technology, oral language, written symbols, pictures, concrete materials/models, real-world situations, while also:
  - a. Identifying and understanding strengths and limitations of various representations of mathematical concepts
  - b. Linking representations to underlying mathematical theories and to other representations.
3. Use and understand the correct usage of mathematical language by:
  - a. Analyzing mathematical vocabulary in the context of mathematical concepts when listening and responding to students' questions and comments
  - b. Evaluating their own and colleagues' presentation of mathematical definitions and terms, as well as considering students' culture, language, and cognitive needs when using academic language to scaffold instruction

## **Standard 3: Pedagogical Knowledge and Practices for Teaching Mathematics**

The program provides candidates with opportunities to develop advanced practices in the use of students' mathematical thinking, mathematical representation, mathematical language, mathematics curriculum, instructional planning, classroom discourse, and assessment. The program will provide opportunities for candidates to develop advanced skills in evaluating, planning, and implementing appropriate interventions to increase student achievement.

The program will provide opportunities for candidates to develop the type of pedagogical expertise needed to modify curriculum to address the specific needs of diverse groups of students, including but not limited to struggling students, English language learners, gifted and talented students, and students with special needs.

Candidates must be able to demonstrate advanced competency to:

1. Plan and implement mathematics instruction in developmentally and culturally responsive ways to meet specific student needs, including the ability to

- a. Analyze and adapt resources, technologies, and standards-aligned instructional materials, including adopted materials, for targeted audiences based on students' cultural, linguistic, and cognitive development
  - b. Identify and connect concepts that are fundamental to learning mathematics, such as place value, fractions, real numbers and algebra
2. Plan instruction that supports students' learning of mathematics by:
  - a. Selecting and developing student learning tasks that enable teachers to understand the conjectures and generalizations that students make
  - b. Aligning instructional goals, assessments, instructional strategies, and practice (e.g., assignments, homework) using SDAIE strategies as appropriate
  - c. Designing and implementing flexible grouping strategies (homogeneous, semi-homogeneous, heterogeneous, large group, small group, and individual learning) according to students' needs and level of achievement
  - d. Focusing on the mathematics content standards and the key concepts within the standards
  - e. Collaborating with individual teachers (pre-service, novice, and experienced) through co-planning and co-teaching to improve student learning
3. Develop strategies for classroom discourse by being able to:
  - a. Facilitate student to student interaction
  - b. Analyze questioning strategies to lead discussions that actively involve all students
  - c. Select culturally appropriate examples and reframe problems to encourage students' deep understanding within a mathematical context
  - d. Advance and cultivate positive attitudes toward mathematics; encouraging curiosity, flexibility, and persistence in solving mathematical problems
4. Use assessments for:
  - a. Identifying gaps in students' knowledge and for designing instruction to bridge the gaps, language assessments for identifying gaps in understanding mathematics terms, summative assessments and standardized assessments for measuring student growth
  - b. Guiding instruction and developing curriculum that is targeted, accommodated, and differentiated for intensive intervention as necessary
  - c. Communicating progress to students, parents, colleagues, and other appropriate service providers
  - d. Deriving demographic, process, and outcome data at the student, school, and district levels to support informed decisions in designing targeted instruction that promotes students equitable access to learn high-level mathematics

#### **Standard 4: Field Experiences**

Programs facilitate individualized and balanced field experiences that provide candidates with timely and ongoing feedback to guide improvements in practice as described in Category B. These field experiences are integrated into coursework and are aligned with the candidate competence standard.

The guided field experiences extend candidates' understandings of the three domains and their elements. The candidate is provided substantive opportunities to observe and practice each of the proficiencies described in Category B. The fieldwork component will include the following

grade spans: Kindergarten through Grade 3 and Grade 4 through Grade 7 for the candidates that are prepared to teach K through Pre-Algebra. In addition, candidates prepared to teach K through Algebra I also have field experience in Algebra 1. The program collaborates with local educational agencies in providing guidance, site-based support, and coordination of field experiences to ensure the candidate has successful experiences working with English learners, students with disabilities, students who are gifted and talented, and students at risk.

### **Category C: Candidate Competence**

#### **Standard 5: Determination of Candidate Competence**

Program sponsors use multiple measures to determine that each candidate has demonstrated competence across the proficiencies described in Category B, including advanced level culminating projects to demonstrate professional competency. Program options for advanced level culminating projects to demonstrate professional competency may include, but are not limited to, professional presentations, action research, designing curriculum, and school, district, or county collaborative projects.

## **Mathematics Instructional Leadership (MIL) Specialist Proposed Program Standards**

### **Category A: Program Design**

#### **Standard 1: Program Design**

The preparation programs and their prerequisites include a purposeful, interrelated, developmentally designed sequence of coursework and field experiences. Programs provide integrated coursework and fieldwork through a model that enables each candidate to demonstrate proficiency as a MIL Specialist. The program includes a planned process for the comprehensive assessment of candidates in the following areas:

1. Understand practitioner research and encourage teachers to use it in their practice
2. Design and implement professional development that engages teachers, administrators, and parents while promoting student engagement and achievement in mathematics
3. Analyze and use data to design solutions to the challenges of developing mathematical literacy among California's diverse population
4. Lead a professional community of practitioners to promote student engagement and achievement in mathematics and minimize the achievement gap

### **Category B: Curriculum and Fieldwork**

#### **Standard 2: Leadership Knowledge and Skills for the Mathematics Instructional Leader:**

The candidate will facilitate the use of a variety of appropriate content-based learning materials and learning strategies that recognize students as active learners, understand the importance of reflection and inquiry, emphasize the quality of student application and performance, utilize appropriate and effective technology, and accelerate mathematics achievement for all students, including English Learners, students with special needs, gifted and talented students, and students at risk. Candidates will guide and support the long-term professional development of staff, consistent with the ongoing effort to improve the learning of all students, relative to the content standards, and provide opportunities for all members of the school community to develop and use skills in distributed leadership and shared responsibility. The candidates will utilize multiple assessments, including assessments that are sensitive to the learning needs of special populations in terms of language, culture, language and processing and cognitive difficulties, to evaluate student learning in an ongoing process focused on improving the academic performance of each student.

Specifically, the program prepares candidates to demonstrate expertise in the following four areas: research-supported mathematics teaching, learning and coaching, professional development and learning, using data to inform student instruction and professional development, and developing professional learning communities.

#### **Standard 3: Fieldwork Integrated with Coursework for Mathematics Instructional Leader:**

Candidates are provided extensive opportunities to observe, acquire, and use appropriate

pedagogical content knowledge for teaching, coaching, and mentoring, and to acquire skills to design and implement innovative processes that are research supported, including uses of technology. Programs provide candidates with timely and on-going feedback to guide improvement in practice through action research connected to instruction, program design, assessment, and leadership. These field experiences are embedded in coursework and aligned with the program assessment standards. The program provides opportunities for candidates to collaborate with local educational agencies in providing guidance, site-based support, and supervision of field experiences.

Programs facilitate individualized and balanced field experiences that provide candidates with timely and ongoing feedback to guide improvements in practice as described in Category B. These field experiences are integrated into coursework and are aligned with the candidate competence standard. Candidates will support opportunities for all members of the school community to develop and use skills in collaboration, distributed leadership, and shared responsibility in ways that are sensitive to students' families' cultures.

MIL Specialist credential candidates must also demonstrate the capacity to analyze the effectiveness of their own practices in terms of the direct impact of their practices on the people with whom they work (e.g., students, teachers, parents, administrators, and community members), in part, by minimizing the achievement gap, and the real or potential impact of their practices on research of students and student learning of mathematics.

### **Category C: Assessment of Candidate Competence**

#### **Standard 4: Determination of Candidate Professional Competence for the Mathematics Instructional Leader:**

Program sponsors may provide any combination of advanced level culminating projects through which candidates demonstrate professional expertise and competency that reflect the candidates' capacity to tailor assessment, instruction, and professional support to the needs of all students, including the special needs of students of different cultures, language levels, and with processing and cognitive difficulties. Candidates will collect field-based evidence throughout the program to demonstrate competence in the four areas of leadership practice at various grade spans (Kindergarten-3, 4-7, Algebra I, Geometry, Algebra II, and Advanced Mathematical study). The evidence should be integrated and demonstrate a professional level of proficiency.